Westford Tree and Invasive Species Inventory and Management Plan

with Tree Planting Plan

Public Forum 2
Thursday January 19, 2023

Image: Westford Comprehensive Master Plan

TOWN OF WESTFORD · INCORPORATED SEPT. 23, 1729

MVP Municipal Vulnerability Preparedness

DAVEY Resource Group

DODSON & FLINKER
Landscape Architecture and Planning

Welcome!

Agenda

7:00   Introductions

7:10   Overview of Plan Draft

7:40   Clarifications

7:45   Key Issues Discussion

8:50   Next Steps & Closing

Image: Westford Open Space & Recreation Plan

Image: Google Street View

Meeting Objectives

1. Review the structure, findings, and recommended actions of the draft *Tree and Invasive Species Inventory and Management Plan* and *Tree Planting Plan*

2. Discuss key issues and refine actions and tradeoffs in the plans

Background

Municipal Vulnerable Preparedness (MVP) Action Grant

Furthering a community identified priority action to address climate change impacts
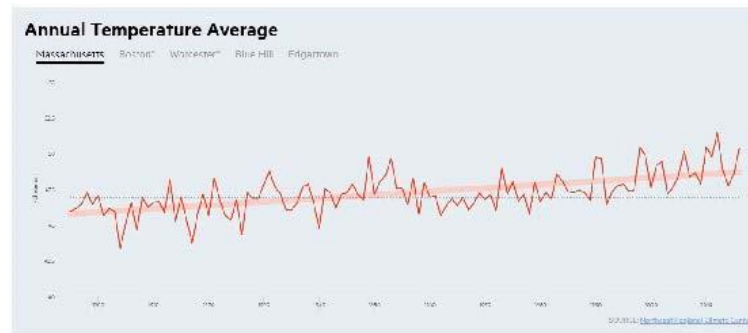

Image: Davey Resource Group

Image: Westford Hazard Mitigation Plan

Image: Westford Hazard Mitigation Plan

Image: Westford MVP Report

TOWN OF WESTFORD MUNICIPAL VULNERABILITY PREPAREDNESS

Community Resilience Building Workshop
Built Environment/ Infrastructure Vulnerability & Strengths

May 21, 2020

TOP NATURAL HAZARDS – FUTURE
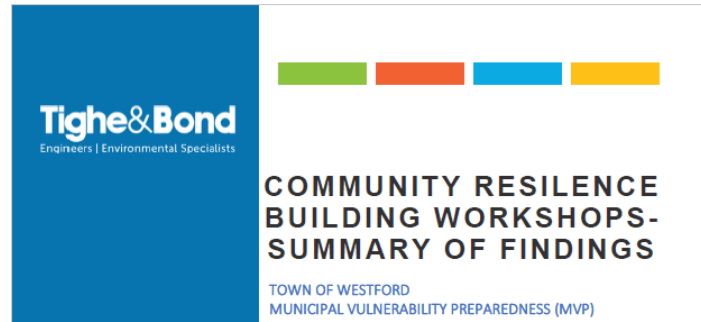
- Invasive Species
- Extreme Temperature/Drought
- Ice storm
- Hurricane/Tropical Storm

Recommendations

COMMUNITY RESILENCE BUILDING WORKSHOPS- SUMMARY OF FINDINGS

TOWN OF WESTFORD MUNICIPAL VULNERABILITY PREPAREDNESS (MVP)

$ Investment

- Undertake a tree inventory & management program
- Map invasive species

✏ Regulation

- Amend zoning bylaws to address urban heat island effects by adjusting planting requirements

- Change code to require development to plant larger and more trees

Education

- Educate municipal staff, officials, and the public about invasive species

MVP Core Principle

1. Furthering a community identified priority action to address climate change impacts

Benefits of Trees

MVP Core Principle

3. Employing Nature-Based Solutions
Using natural systems to address natural hazards like flooding, erosion, drought, and heat islands

absorbs rain
reduces burden on sewers and streams[1]

cleans the air
provides oxygen and fights climate change[4]
$CO_2 \rightarrow O_2$

improves health
decreases stress levels and encourages walking, exercise[2]

promotes biodiversity
provides habitat, food, and shelter for other plants[5]

adds value
trees increase property values[3]
$$$

provides shade
and lowers air temperature

Image: Dodson & Flinker

Environmental Justice

Massachusetts Executive Office of Energy and Environmental Affairs

- *Equal protections* from environmental harms

- *Equitable distribution* of environmental benefits

- *Meaningful involvement* in the development, implementation, and enforcement of environmental laws and policies
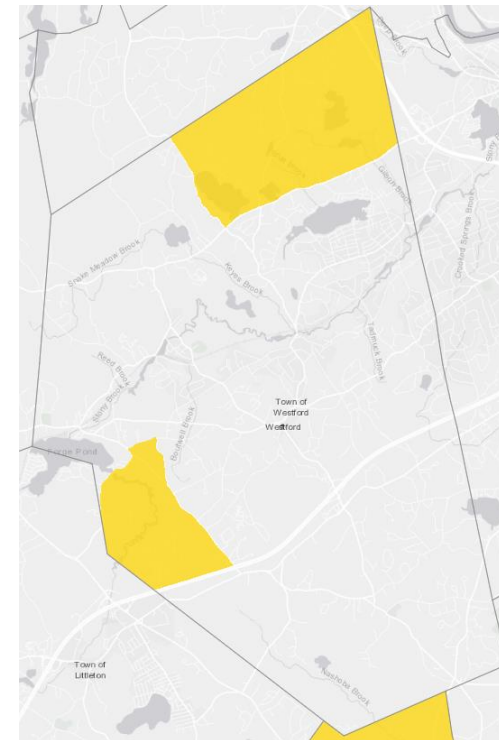
MVP Core Principle

4. Increasing equitable outcomes for and supporting strong partnerships with Environmental Justice (EJ) Populations and Climate Vulnerable Populations
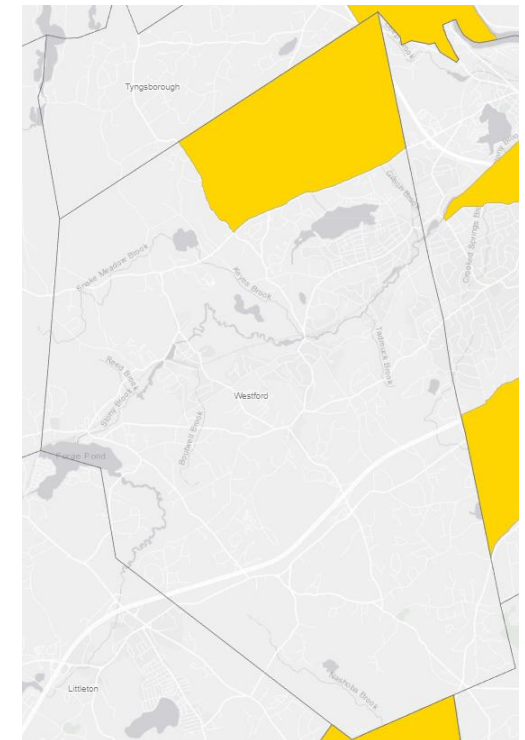
Environmental Justice Block Groups
Criteria: "Minority"

2010

2020

Project Objectives

➤ Help Westford meet its climate resilience goals

➤ Educate the public about trees and invasive species

Image: Westford MVP Plan

Image: Davey Resource Group

Images: Westford Conservation Trust

➤ Provide resources for sustaining Westford's trees along the public right-of-way, including along scenic roads and near Environmental Justice communities

Images: Davey Resource Group

Project Timeline

Date	Task
Fall 2021	Project Kick-off
Spring 2022	First Public Forum; Community Survey; Tree and invasive species inventory
Summer-Fall 2022	Plan development
Winter 2023	**Second Public Forum, Plan revisions**
Spring 2023	Final Plan

Plan Structure

I.   Introduction

II. The Urban Forest and Climate Resilience

        Background

III. Structure & Composition of Westford's Urban Forest

        Inventory

IV. Recommendations & Strategies

V. Budget & Funding

VI. Ten-Year Action Plan

        Management Plan

VII. Conclusion

Image: Davey Resource Group

Appendices

F. Invasive Species Guide

Images: Davey Resource Group

G. Tree Planting Plan and Species List

Image: Dodson & Flinker

Image: Davey Resource Group

Inventory – Composition & structure of the urban forest

Site Analysis

- Where are trees and invasive species growing?
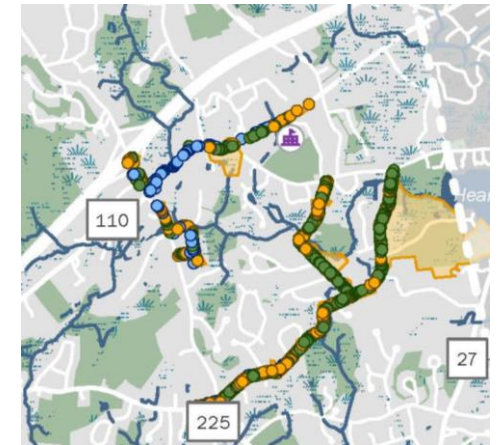
Tree Analysis

- How many trees and what kind?
- Age, condition, and level of risk
- Benefits
- Vacant spaces for planting

Invasive Species Analysis

- What kind and where?

Primary Maintenance

- What needs to be done?

Inventoried Features
- 🟢 Tree
- 🟤 Stump
- 🔵 Vacant Site
- 🟠 Invasive Species
- ▭ Invasive Species Polygon

Inventory Scope

Street trees – public trees – public shade trees

- Trees within the public right-of-way (ROW)

Study Areas

- 34 miles = 15% of total road milage
- 9 scenic roads

Data Collected

Point observations: trees, stumps, vacant sites, invasive species

Invasive Species Polygons: contiguous areas of invasive species

Scenic Roads

Primary study area

Preliminary inventory

Legend

- Road
- Water
- Wetland
- Conservation Area
- 2020 Environmental Justice Block Group
- School
- Public Library

Inventoried Features

- Tree
- Stump
- Vacant Site
- Invasive Species
- Invasive Species Polygon
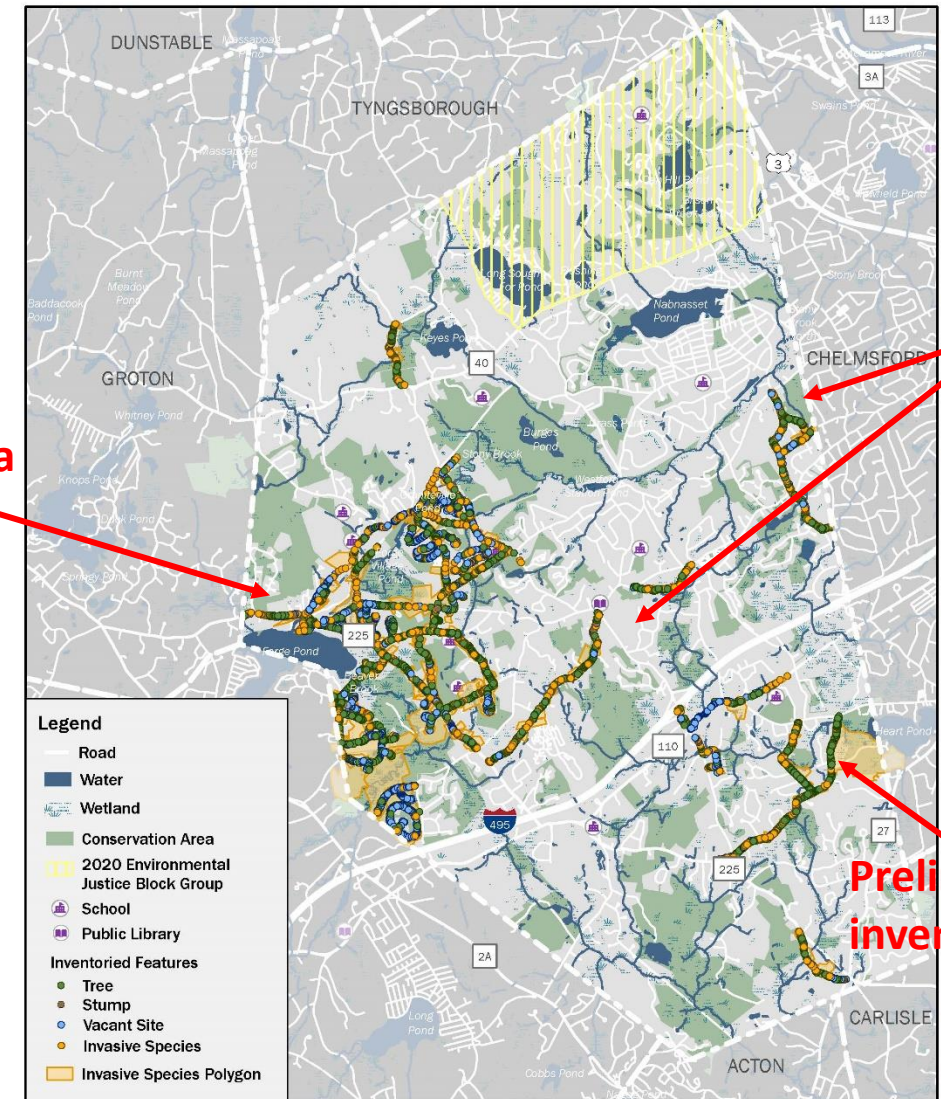
2022 Full Inventory
Tree & Invasive Species Inventory and Management Plan
Westford, MA
Draft: 12/13/22

Prepared by:
DODSON & FLINKER
Landscape Architecture and Planning

Data Sources: MassGIS

Miles
0   0.5   1

TreeKeeper Software

Site Analysis

Point Features	Count	% Located on a Scenic Road	% Located under overhead utility	Other site issues
Trees	3,545	46%	55%	2% causing clearance or visibility issues 0.5% with hardscape damage
Stumps	112	45%	45%	N/A
Vacant sites	875	9%	30%	29% set back from ROW
Invasive species	2,382	45%	45%	0.1% causing clearance or visibility issues
TOTAL	**6,914**	**41%**	**48%**	**N/A**

Site Analysis

Key Findings

- Public tree distribution is mixed
  - 91% of vacant sites were found along non-scenic roads
  - 54% of trees were found along the 75% of road milage that was not a scenic road

- Over half of public trees are located under overhead utilities, which may inhibit tree health and present maintenance challenges.

- Setback sites are a major tree-planting opportunity

Tree Analysis – Diversity

Tree Genera Diversity

% of Inventoried Tree Population (Y-axis: 0% to 40%)

- oak: 35%
- maple: 21%
- pine: 19%
- cherry: 4%
- hickory: 3%
- spruce: 3%
- elm: 2%
- ash: 2%
- arborvitae: 1%
- apple: 1%
- hemlock: 1%
- birch: 1%
- linden: 1%
- juniper: 1%

Genus (X-axis)

Legend: ▇ Westford — Industry Recommendation (20%)

Top 3 Species in Inventory

Eastern white pine (18%)

Northern red oak (12%)
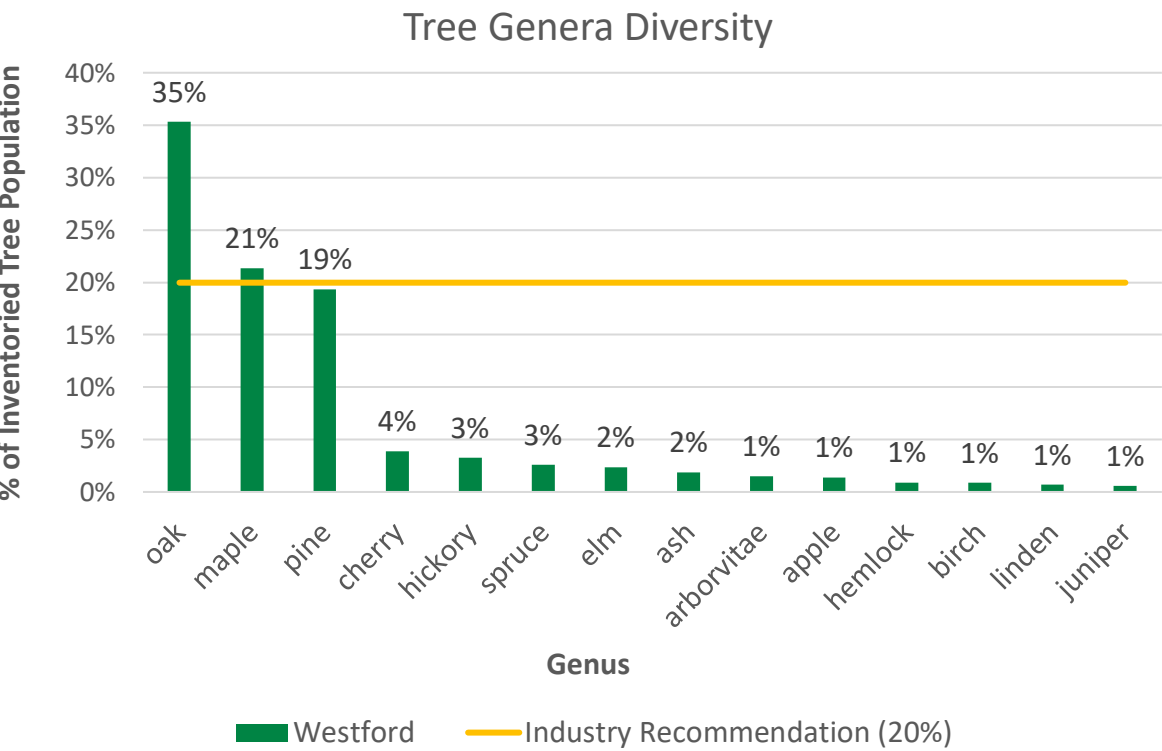
Red maple (11%)

The 10-20-30 Rule

No more than:

10% of one **species**

20% of one **genus**

30% of one **family**

Source: Santamour (1990)

Tree Analysis – Susceptibility

Pest & Disease Susceptibility of Inventoried Trees

Pest or Disease	Percent
spotted lanternfly	82%
spongy moth	42%
oak wilt	35%
Asian longhorned beetle	27%
southern pine beetle	20%
white pine decline	19%
elongate hemlock scale	3.8%
emerald ash borer	1.9%
hemlock wooly adelgid	0.9%
red pine scale	0.5%
beech diseases	0.1%

Percent of Inventoried Trees Susceptible to Pest or Disease

Spotted Lanternfly

Images: Davey Resource Group

Oak wilt

Image: Bugwood.org

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Tree Analysis – Age Structure

Age Structure of Westford Trees
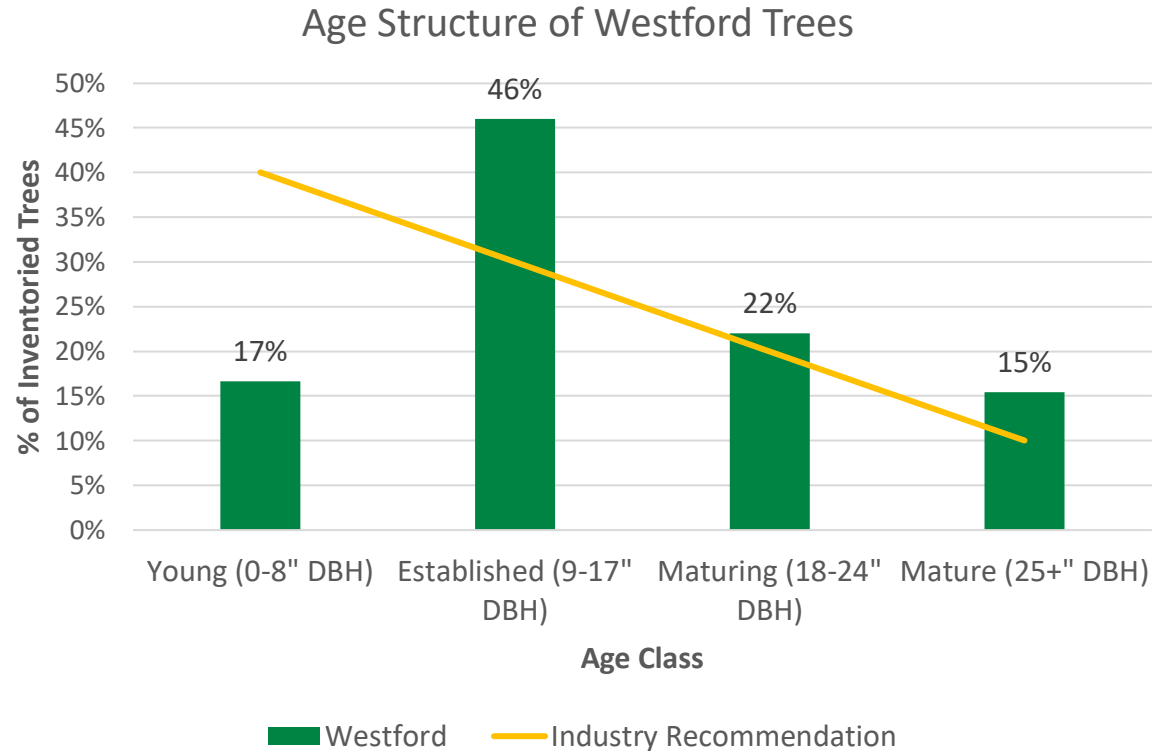
Target Age Structure

40% young trees

30% established trees

20% maturing trees

10% mature trees

Source: Richards (1983)

*To maximize resources, **young trees** were not inventoried in wooded areas, which tend to self-seed…*

…but they were in developed areas, which require intentional planting.

Images: Davey Resource Group

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Tree Analysis – Defects and Tree Condition

Defects of Inventoried Trees

Tree Condition
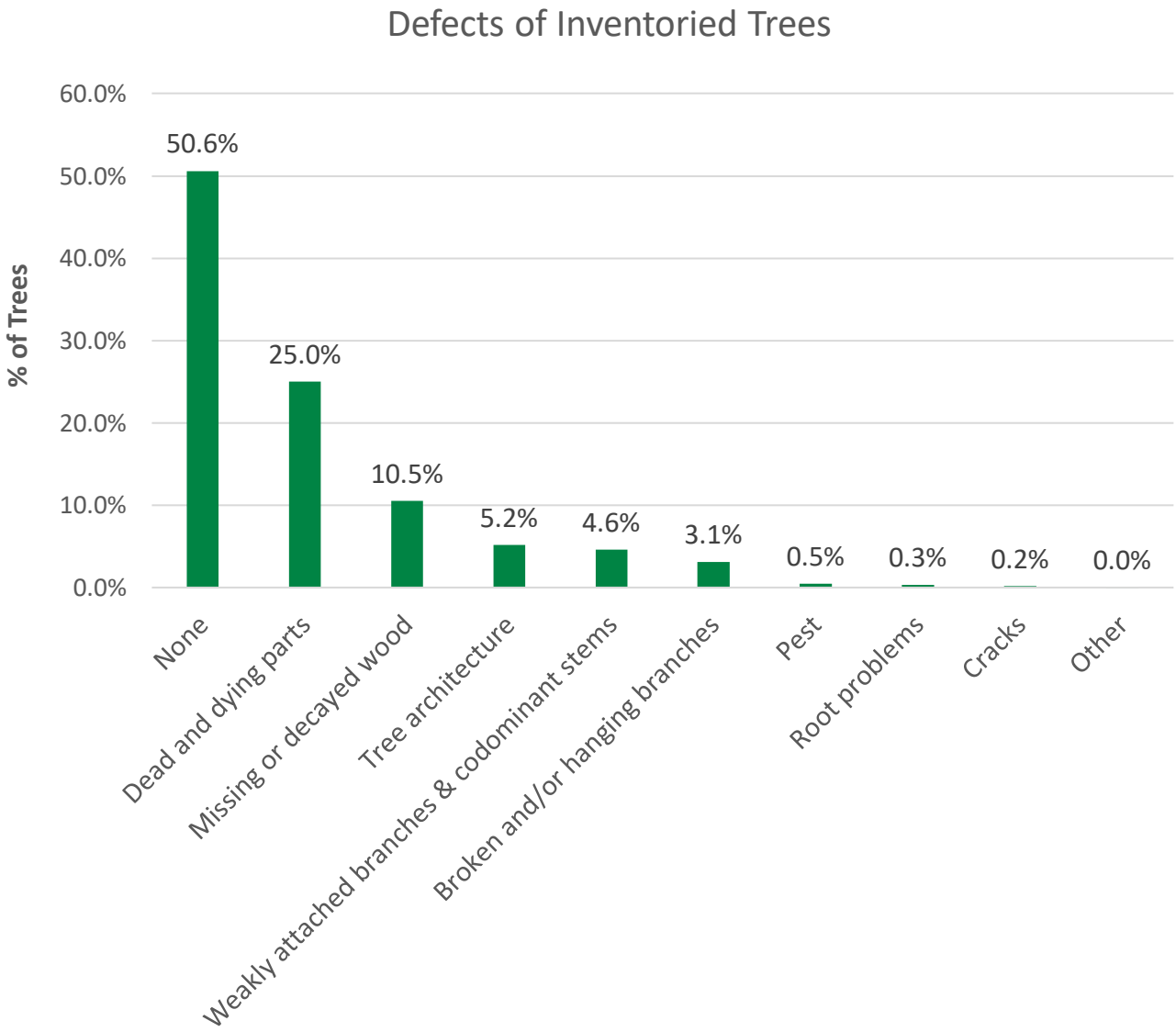
Tree Analysis – Estimated benefits

Estimated annual environmental benefits

Stormwater interception
942,961 gallons
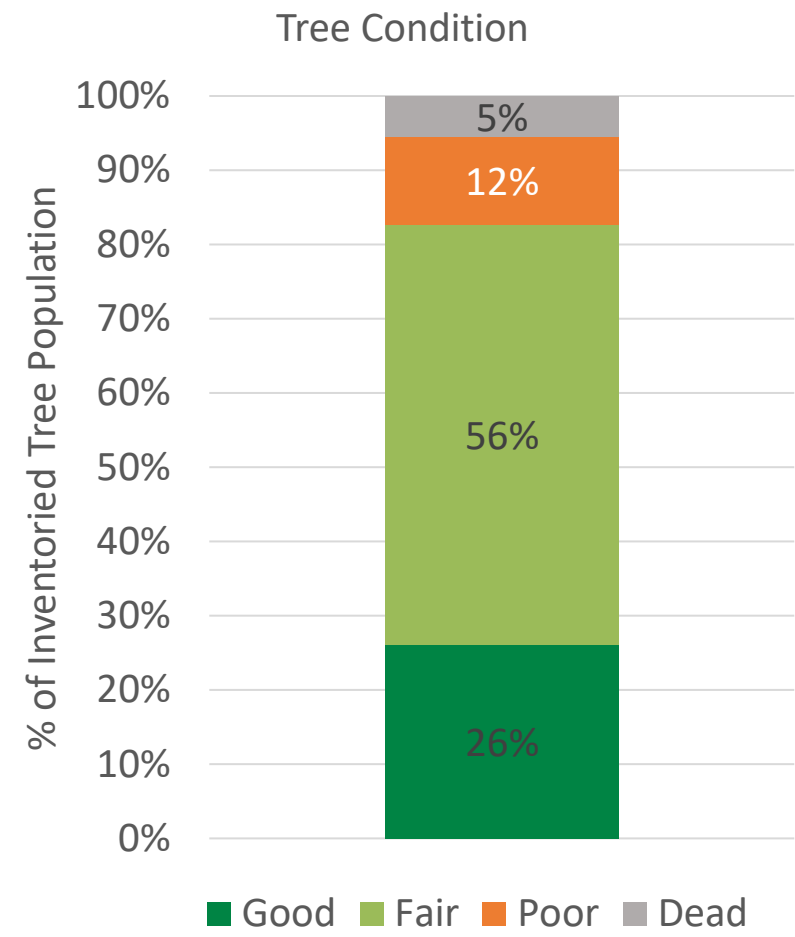
Carbon sequestration
40 tons of carbon

Carbon storage
2,891 tons of carbon

Air pollutant removal
Sulfur dioxide (SO2)
Carbon monoxide (CO)
Nitrogen dioxide (NO2)
Ozone (O3)
Particulate matter (PM2.5)
2,651 pounds TOTAL

Monetary value of estimated benefits

Annual Benefits Provided by Inventoried Trees
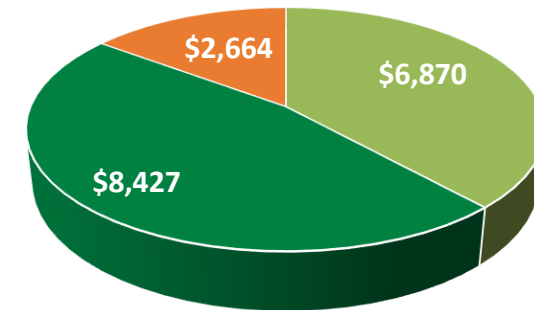
- Carbon Sequestration
- Avoided Runoff
- Pollution Removal

$2,664
$6,870
$8,427

Collective annual benefit value = $17,961

Collective replacement value = $9,690,901

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Tree Analysis

Strengths	Weaknesses
• Overall condition is fair to good • Many of Westford's inventoried trees are not yet mature, which should ensure canopy continuity for the near future. • Annual environmental benefits estimated to provide $17,961	• Low species diversity may leave the urban forest vulnerable to threats targeting dominant species • Three genera represent 75% of all inventoried trees • Susceptible to at least 11 pests and diseases • Half of trees have significant defects requiring maintenance

Invasive Species Analysis

Top 10 Invasive Species Found in Point Observations

Top 10 Invasive Species Found in Polygon Areas
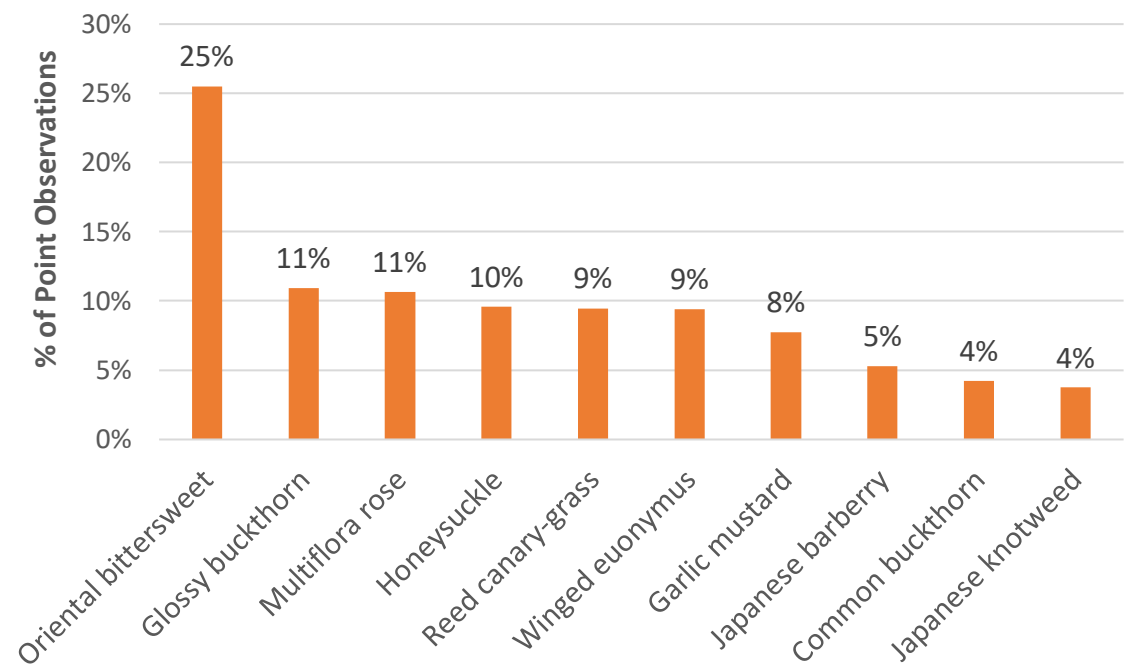
Oriental bittersweet

Glossy buckthorn

Multiflora rose
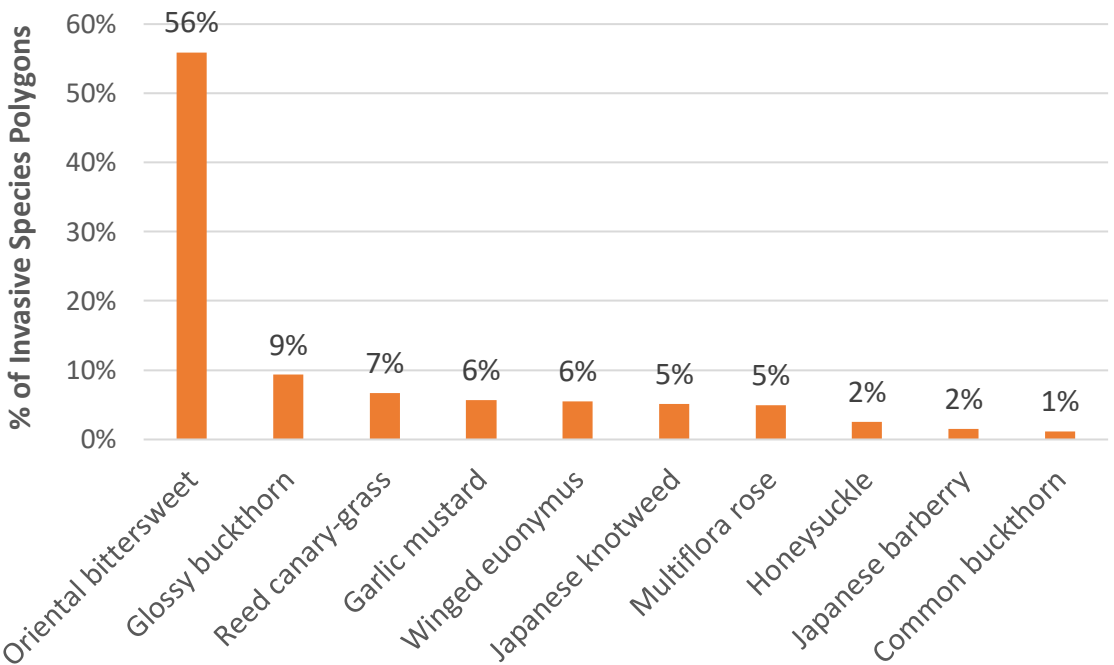
Morrow's honeysuckle

Reed Canary-grass

Winged euonymus

Invasive Species Found in Westford

Images: Davey Resource Group

Invasive Species Analysis

Strengths	Weaknesses

• Invasive tree species are at manageable levels
 	
  • Norway maple represents 7% of all tree species; no other invasive tree species was identified in significant numbers
	• Invasive plant species are common and diverse
	
	  • 21 species found
	
	  • Nine species identified in more than 100 point observations, and seven in more than 25 invasive polygon areas
	
	• Oriental bittersweet was the most common invasive species

Primary Maintenance – Trees

Prune

Routine Prune

Train

Remove

Maintenance Task	Risk Level	# and % of Trees
Prune	Low, Moderate	950, 27%
Routine Prune	Low, Moderate	2,196, 62%
Train	Low	122, 3.4%
Remove	Low, Moderate, High	269, 7.5%

Images: istockphoto.com (top left and right);
oregonlive.com (bottom left); Wikimedia.org (bottom right)

Primary Maintenance – Other Tasks

Stump removal (112)

Tree Planting on Vacant Sites (875)
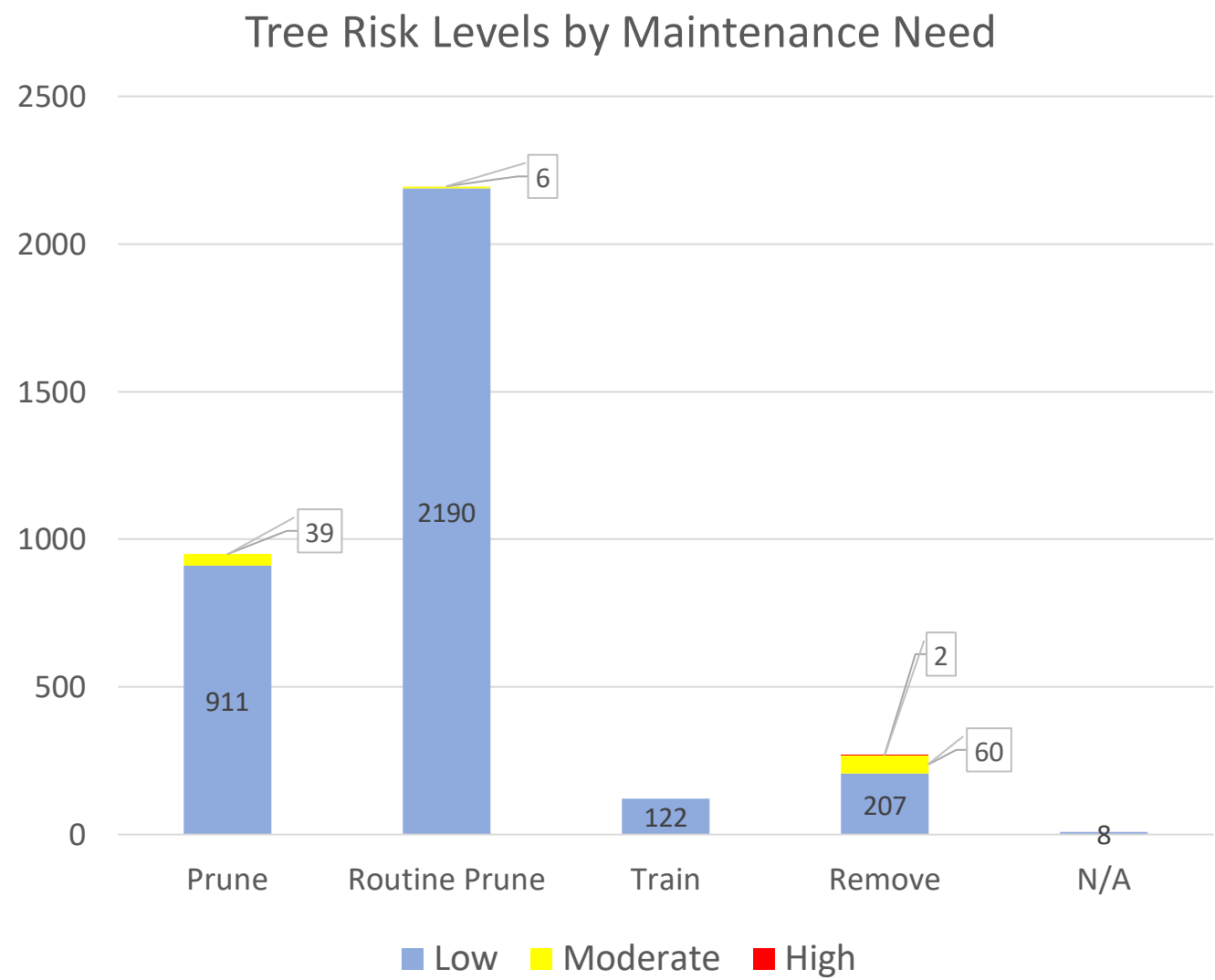
Invasive Species Management (2,382)

Images: stumpgrindingremovalmd.com (left); Kestrel Land Trust (middle); Green Abundance by Design (right)

Tree Maintenance and Risk
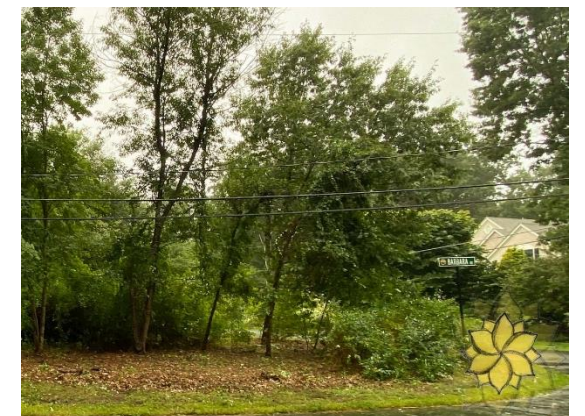
Tree Risk Levels by Maintenance Need

Primary Maintenance

Strengths	Weaknesses
• Most tree risk and maintenance needs are lower-priority and manageable within a routine maintenance cycle	• Higher-priority maintenance needs require removals and pruning
• 97% of trees are low-risk	• 2 high-risk, 60 moderate-risk tree removals
• No extreme-risk trees	• 39 moderate-risk trees require priority pruning
• Only 2 high-risk trees	• 207 other tree removals
• 62% of trees may be maintained with a routine pruning cycle	• 2,382 patches of invasives to manage

Opportunities

Maintenance

Pruning is a key area of training for Town staff.

Tree Planting

Setback sites are a major opportunity for tree planting.

- 29% of vacant sites are "set back" on adjacent properties within 20 feet of the ROW
- Setback sites may provide better conditions for trees, but require more coordination

Invasives Management

Invasives species management requires coordination with adjacent property-owners.

- Many invasive species polygons extended into properties off the ROW

Inventory

More funding and investment is required to complete the inventory.

- The inventory covered about 15% of all local roads

Community Input – First Public Forum

Community Concerns

- Invasives, pests, & disease
- Loss of trees without replacement
- Lack of public awareness about invasives or tree maintenance

Community Recommendations

- Prioritize tree maintenance
- More public education
- Stronger tree protections in bylaws
- Opportunities for volunteering
- Alternatives to tree removal for utilities

Recommendations

Fund a proactive urban forestry program
- Prioritize findings from the 2022 inventory
- Build staff and volunteer capacity
- Establish maintenance cycles
- Educate and engage

Establish an ongoing tree planting program

Develop a plan for managing invasive species

Use town regulations to achieve desired results

Priority maintenance of inventoried areas:
A. High-risk trees
B. High-priority invasives

Proactive maintenance of inventoried areas:
A. Routine pruning, removal, and training of trees
B. Routine management of invasives

Tree-planting:
Prioritize inventoried areas with Environmental Justice populations, a high portion of impervious surface, and high numbers of vacant sites

Continued inventory

Clarifications Q&A

Discussion Topics

A. Budget

B. Tree Planting

C. Invasive Species Management

D. Regulatory Changes

Discussion Ground Rules

Share the air – listen and give space for everyone to speak

Demonstrate respect – it's ok to disagree, but we're here to listen & learn

Zoom etiquette
- Please name yourself in your zoom panel
- Camera on is preferable
- It's ok to unmute yourself to respond to others; if needed, we will raise "virtual hands"
- Use the chat as necessary

Community Survey

Higher-Cost Actions
- ➤ Routine tree care
- ➤ Expand the inventory
- ➤ Staff invasive species management

Would you support dedicating more of the town's budget to fund urban forestry actions?

Lower-Cost Actions
- ➤ Public guidance
- ➤ Volunteer tree planting events
- ➤ Education on trees and invasive species management

Higher-cost actions for tree and invasive species management
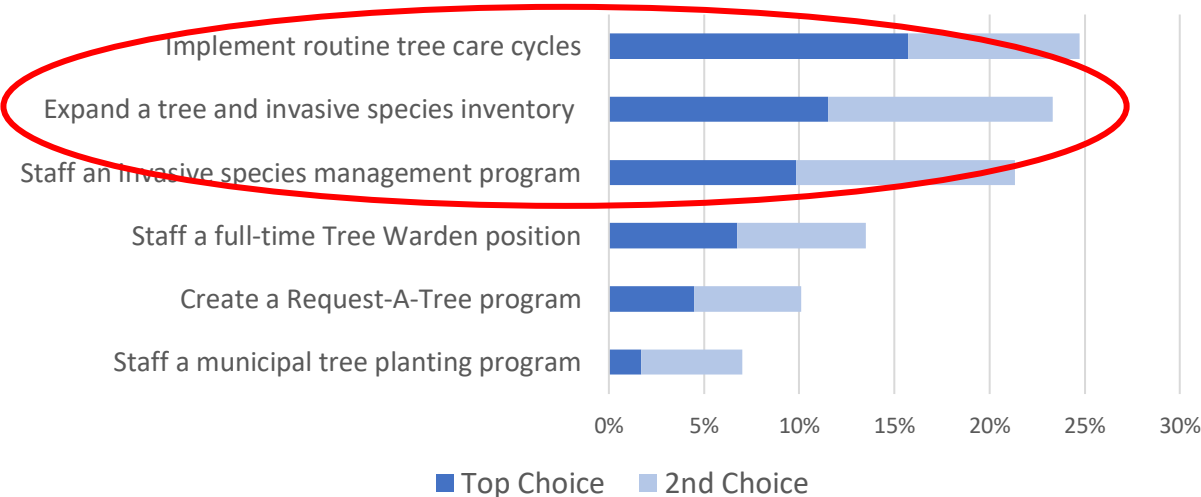
Lower-cost actions for tree and invasive species management, ranked by top two choices combined

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Tree Maintenance and Risk

Tree Risk Levels by Maintenance Need
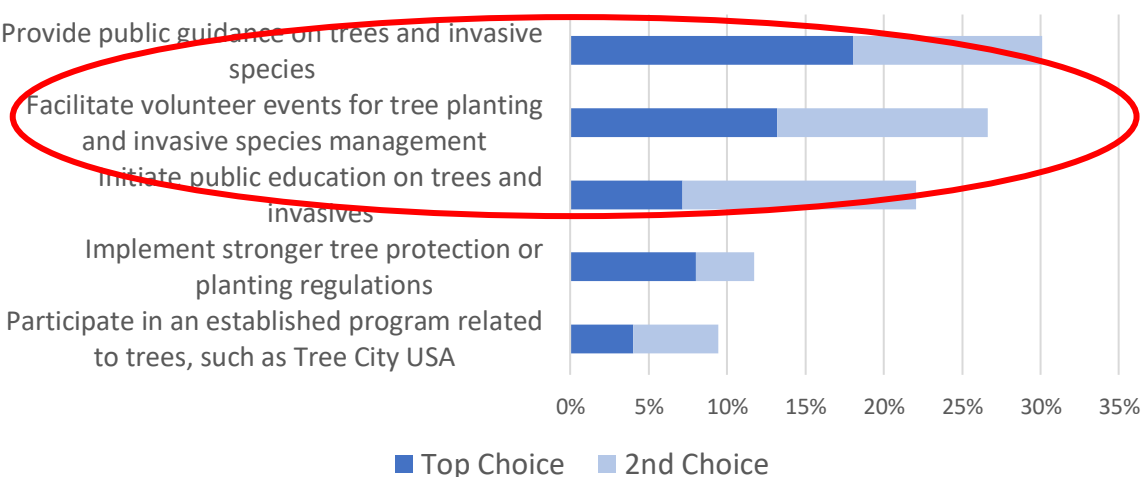
A. Budget

Community Survey
Would you support dedicating more of the town's budget to fund urban forestry practices?

58% said yes
35% needed more info
7% said no

Would you support this budget?

How could or should this budget be funded?

Activity	Ten-Year Cost	Average per year	Years 1-2 Average Cost per Year
Removals Total	$253,525	$25,353	$60,475
Pruning, Training, & Inspections Total	$325,885	$32,589	$35,847
Tree Planting	$833,800	$83,380	$83,465
Cost Grand Total	**$1,413,210**	**$141,321**	**$179,787**

Community Survey

Higher-cost actions for tree and invasive species management

Implement routine tree care cycles
Expand a tree and invasive species inventory
Staff an invasive species management program
Staff a full-time Tree Warden position
Create a Request-A-Tree program
Staff a municipal tree planting program

0% 5% 10% 15% 20% 25% 30%

■ Top Choice ■ 2nd Choice

Lower-cost actions for tree and invasive species management, ranked by top two choices combined

Provide public guidance on trees and invasive species
Facilitate volunteer events for tree planting and invasive species management
Initiate public education on trees and invasives
Implement stronger tree protection or planting regulations
Participate in an established program related to trees, such as Tree City USA

0% 5% 10% 15% 20% 25% 30% 35%

■ Top Choice ■ 2nd Choice

Volunteer activities, ranked by respondent interest

Tree planting activities
Invasive species management activities
Participating in a Request-A-Tree program
Tree and invasive species inventory…
Participating in public education initiatives
Participating in school-based programming
Volunteering on a Public Shade Tree…

0% 10% 20% 30% 40% 50% 60% 70% 80%

■ High interest ■ Some interest

Preferred locations for planting new trees, ranked by top two choices combined

In town parks or recreation areas
In public parking areas, such as for schools and libraries
Along the public right-of-way (i.e. roadsides)
In commercial parking areas

0% 10% 20% 30% 40% 50%

■ Top Choice ■ 2nd Choice

39
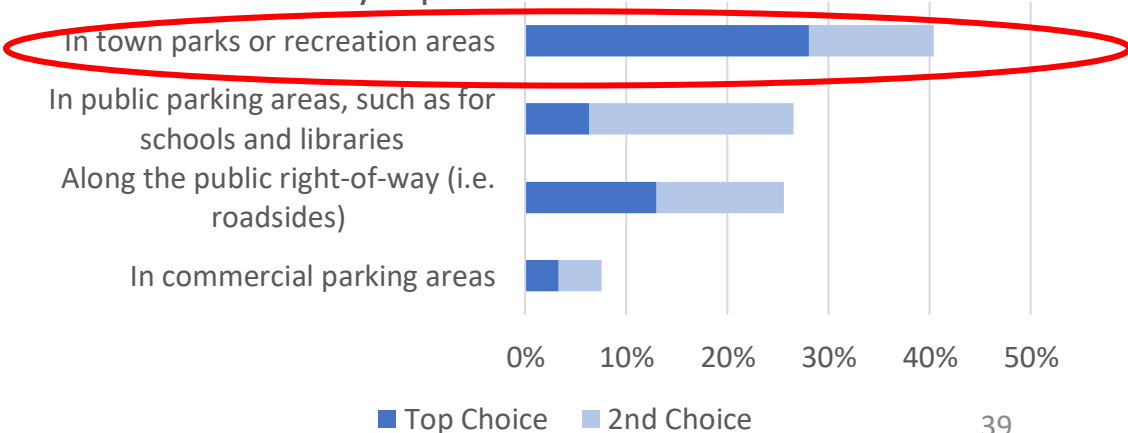
B. Tree Planting

Community Survey

- Lower support for town-led planting
- High support for volunteer-led planting
- Town parks were the most popular tree planting location

Actions

- ➤ 60 replacement trees per year to replace tree loss
- ➤ 5 new trees per year

Activity	Sub-activity	Trees/ Year	Cost/ Tree	Cost/ Year
Replacement Tree Planting & Maintenance	Purchasing, Planting, & Mulching	27	$770	$20,790
	Watering	27	$80	$2,160
Activity Total				**$22,950**
Natural Mortality (1%)	Tree & Stump Removal	33	$855	$28,215
	Replacement Tree	33	$850	$28,050
Activity Total				**$56,265**
New Tree Planting & Maintenance	Purchasing, Planting, & Mulching	5	$770	$3,850
	Watering	5	$80	$400
Activity Total				**$4,250**

B. Tree Planting, cont.

Program 1: Replacement tree planting

Target: 60 trees per year

Program Design
- Trees will be purchased or grown by the town and planted and maintained by the town or contractors.
- Two options for determining planting locations for replacement trees:

Option A. Plant replacement trees near the location of trees that recently died.

Option B. Plant replacement trees in locations that will have a high impact.

Criteria for selecting "high impact" locations:
- Locations within the inventory
- High density of vacant planting sites
- Benefit to populations that will be disproportionately impacted by climate change:
  - EJ communities, young people, older adults, people with low incomes, renters, people with certain chronic diseases, etc.)
- Preferences for:
  - Locations that are suitable for large trees
  - Locations with sidewalks
  - Dead end streets should be avoided

B. Tree Planting, cont.

Program 2: New tree planting

Target: 5 trees per year

Program Design
- Trees provided by the Town of Westford
- Planting labor and coordination handled by volunteers
- Watering during establishment by neighbors
- Other ongoing maintenance (pruning, mulching) by volunteers

Criteria for selecting locations – Same as for replacement trees, plus:
- High visibility locations
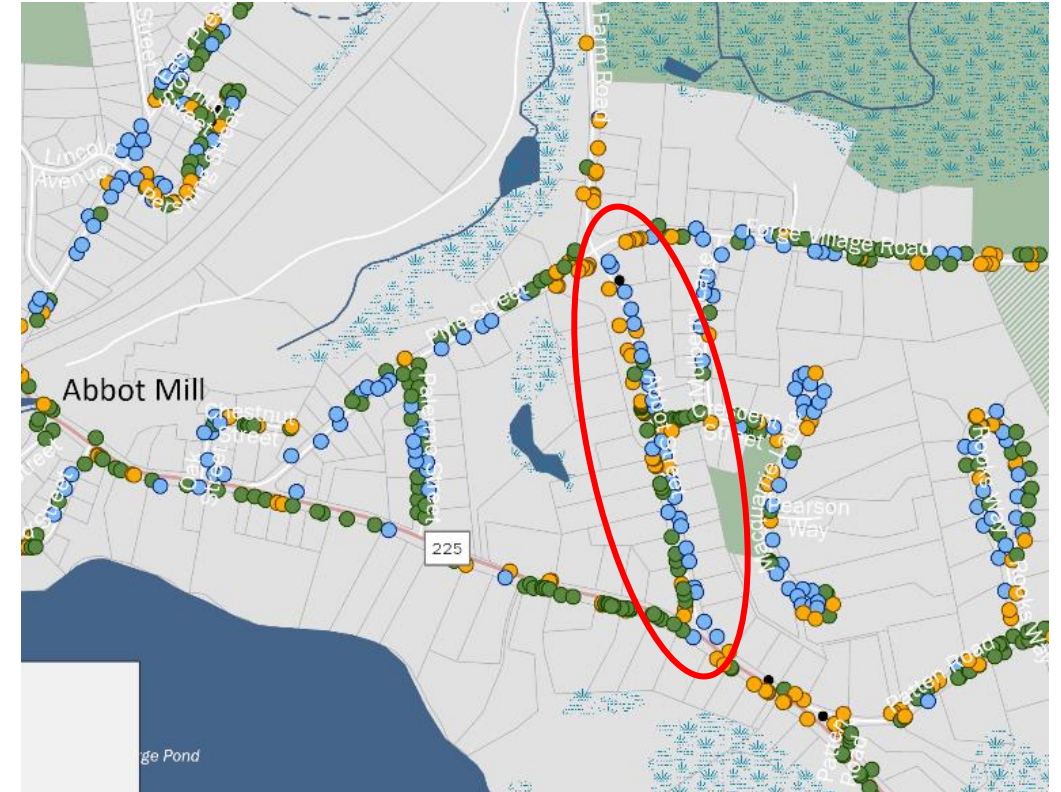- Neighborhood residents and/or businesses demonstrate support and commitment

B. Tree Planting, cont.

Proposed area for initial new tree planting:
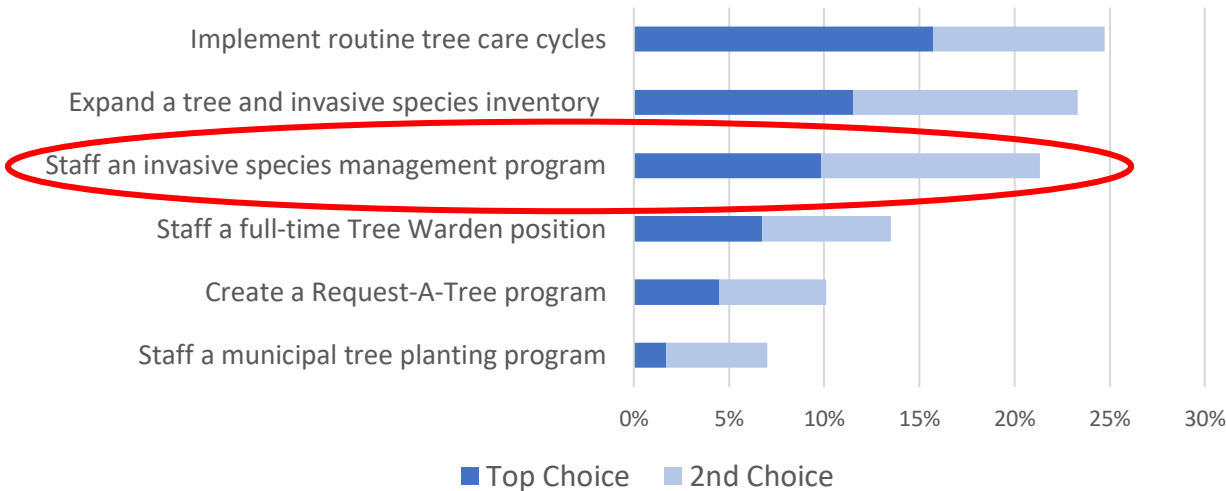**Abbot Street**

Criteria:

- Visible street
- High density of vacant planting sites
- In proximity to Westford Senior Center and a housing authority development
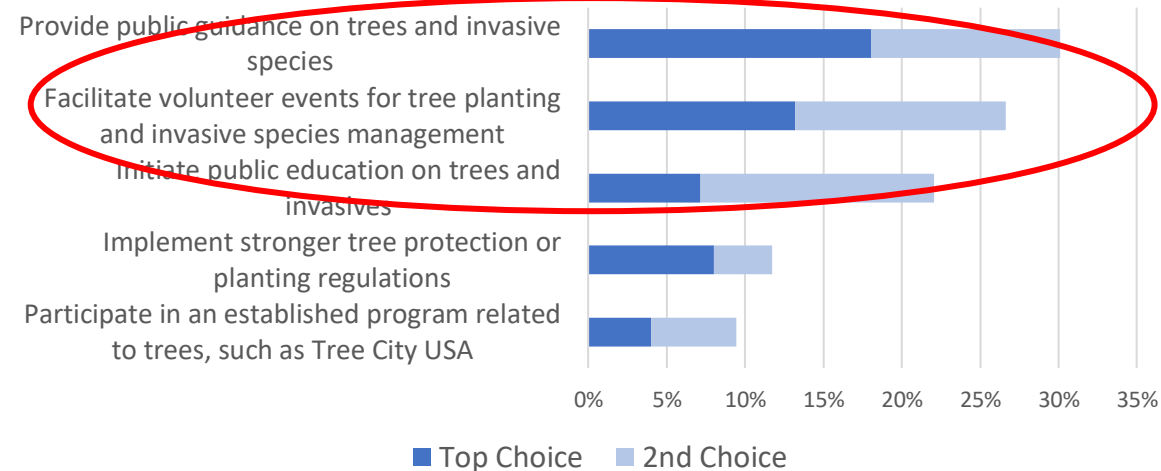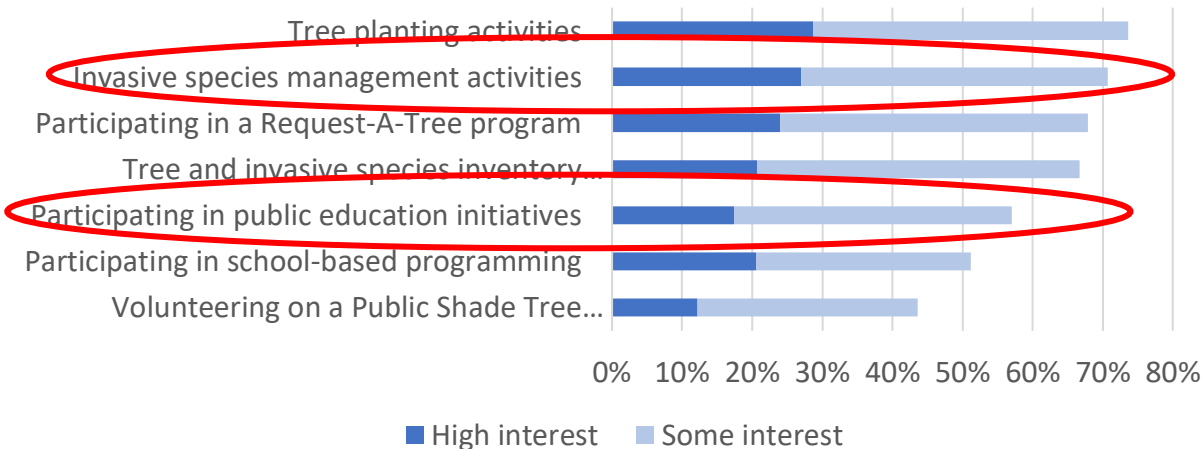- Planting space suitable for large trees

Community Survey

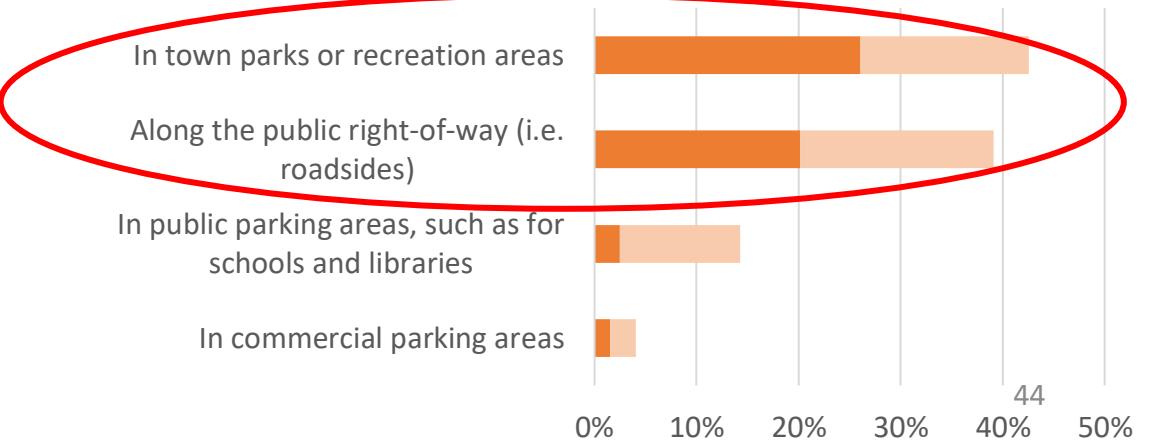## Higher-cost actions for tree and invasive species management

Bars (Top Choice, 2nd Choice):
- Implement routine tree care cycles
- Expand a tree and invasive species inventory
- Staff an invasive species management program
- Staff a full-time Tree Warden position
- Create a Request-A-Tree program
- Staff a municipal tree planting program

0% 5% 10% 15% 20% 25% 30%

■ Top Choice   ■ 2nd Choice

Lower-cost actions for tree and invasive species management, ranked by top two choices combined

Bars (Top Choice, 2nd Choice):
- Provide public guidance on trees and invasive species
- Facilitate volunteer events for tree planting and invasive species management
- Initiate public education on trees and invasives
- Implement stronger tree protection or planting regulations
- Participate in an established program related to trees, such as Tree City USA

0% 5% 10% 15% 20% 25% 30% 35%

■ Top Choice   ■ 2nd Choice

Volunteer activities, ranked by respondent interest

Bars (High interest, Some interest):
- Tree planting activities
- Invasive species management activities
- Participating in a Request-A-Tree program
- Tree and invasive species inventory...
- Participating in public education initiatives
- Participating in school-based programming
- Volunteering on a Public Shade Tree...

0% 10% 20% 30% 40% 50% 60% 70% 80%

■ High interest   ■ Some interest

Preferred locations for invasive species management, ranked by top two choices combined

Bars:
- In town parks or recreation areas
- Along the public right-of-way (i.e. roadsides)
- In public parking areas, such as for schools and libraries
- In commercial parking areas

0% 10% 20% 30% 40% 50%

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C. Invasive Species Management

Leadership

Town-led?

Volunteer-led?

Individual resident initiative?

Other?

Strategy

Focus on areas?

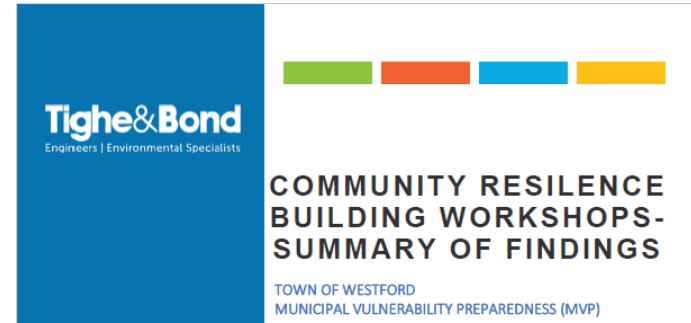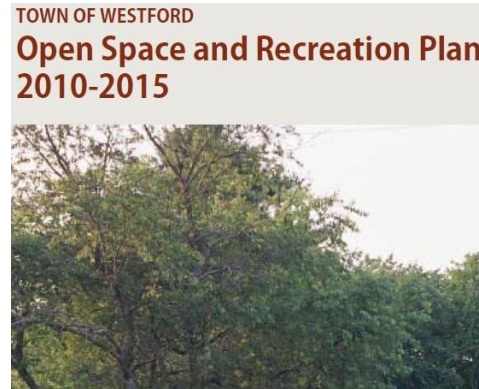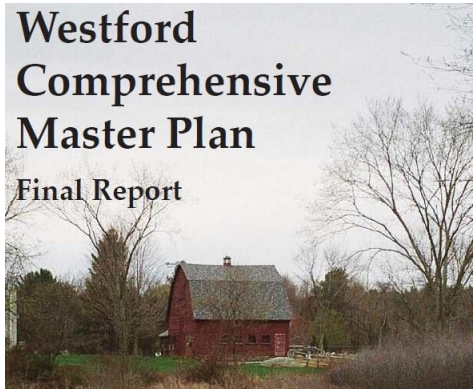Ex: Near water bodies or parks

Focus on species?

Ex: Oriental bittersweet

Combination?

Neither?

D. Regulatory Changes

"Regardless of whether healthy trees are on public or 'private' land, Westford should have laws that require planting trees to replace those cut down for residential, commercial or industrial development."

Community Survey Comments

"The Town of Westford should require a set density of street trees that overrides the homeowners desire for a clear view."

"I wish new construction activities were forced/encouraged to keep more trees on site & plant natives"
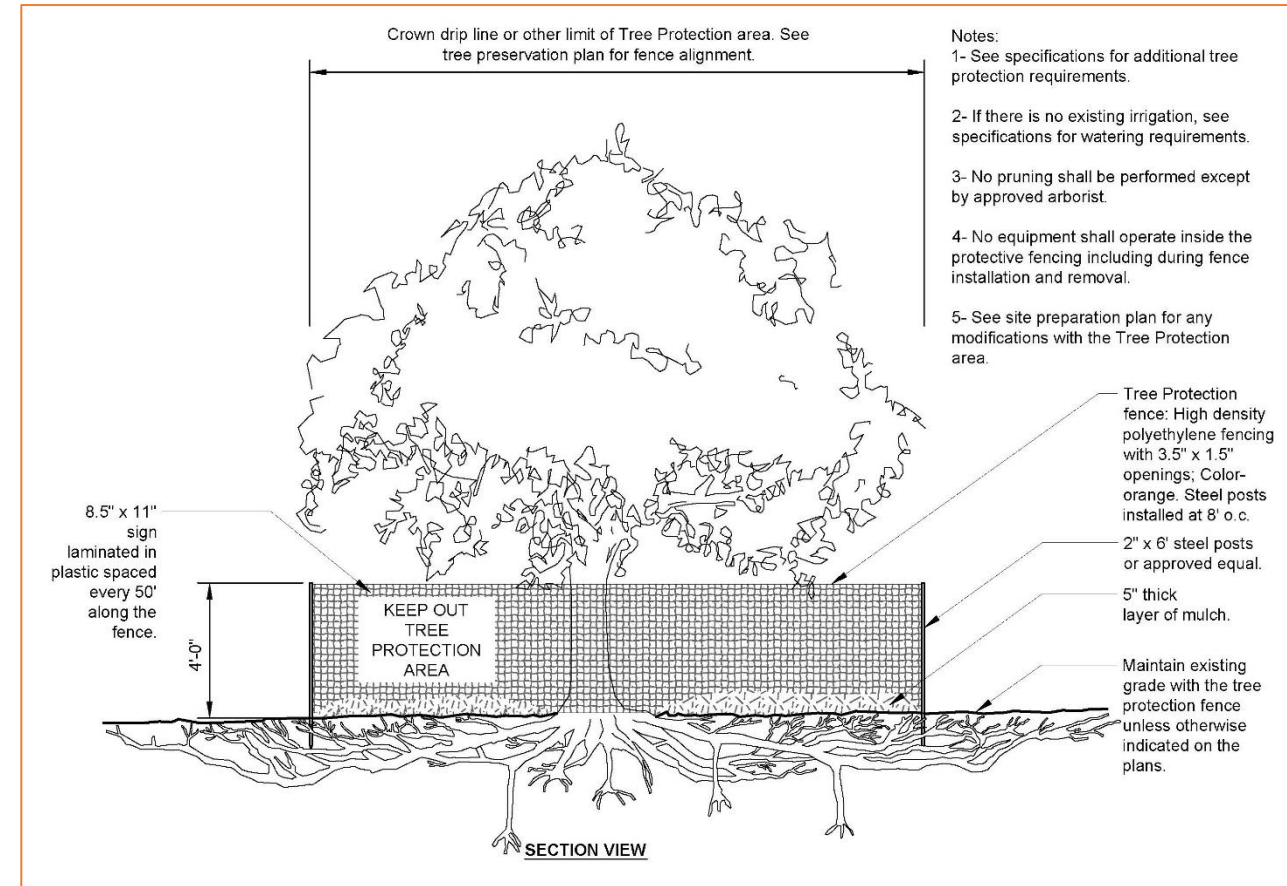
D. Regulatory Changes

Tree Protection in Bylaws and Regulations

Goal: protect significant trees on public and private property

- Require approval for removal of significant trees (size to be determined)
- Require protection of trees during construction
- Require replacement of significant trees or payment to town
- Potential triggers:
  - zoning special permit
  - site plan review
  - subdivision review
  - stormwater permit
  - request to remove a public shade tree
  - work on a scenic road
  - Other action?

Crown drip line or other limit of Tree Protection area. See tree preservation plan for fence alignment.

Notes:
1- See specifications for additional tree protection requirements.

2- If there is no existing irrigation, see specifications for watering requirements.

3- No pruning shall be performed except by approved arborist.

4- No equipment shall operate inside the protective fencing including during fence installation and removal.

5- See site preparation plan for any modifications with the Tree Protection area.

8.5" x 11" sign laminated in plastic spaced every 50' along the fence.

4'-0"

KEEP OUT TREE PROTECTION AREA

Tree Protection fence: High density polyethylene fencing with 3.5" x 1.5" openings; Color-orange. Steel posts installed at 8' o.c.

2" x 6' steel posts or approved equal.

5" thick layer of mulch.

Maintain existing grade with the tree protection fence unless otherwise indicated on the plans.
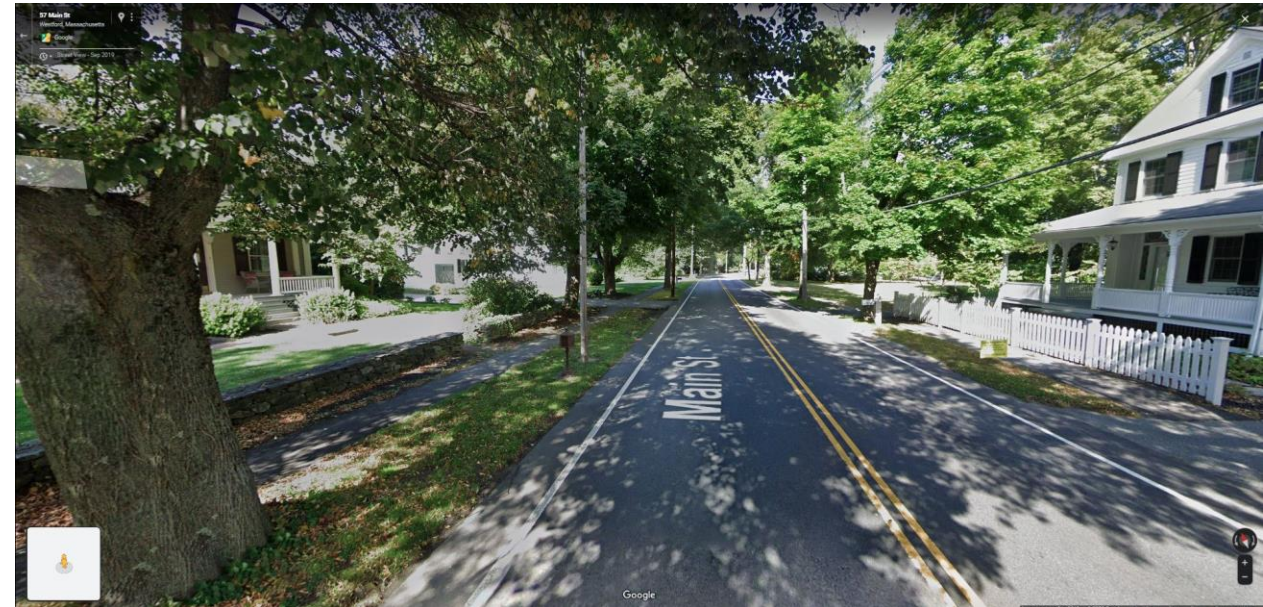
SECTION VIEW

D. Regulatory Changes

Subdivision Rules & Regs

- Require street trees to be spaced more closely
- Plant street trees in planting strips between the curb and sidewalk. Improve specifications for planting strips.
- Establish a recommended tree list
- Require inventory and management of invasive species
- Revisit street design standards

D. Regulatory Changes

Zoning Bylaws

- Buffer requirements
  - Strengthen retention of existing trees
  - Increase required number of new trees
  - Require management of invasives in buffer strips
- Parking
  - Require more trees in parking areas
  - Reduce parking requirements and/or allow Planning Board to waive parking requirement
  - Set a timeline for release of reserved parking area and require tree planting plan there
- Require closely-spaced street tree planting along the frontage of special permit and site plan review projects

- Require invasive species management for special permit and site plan review projects
- Standardize the required caliper of new trees across bylaw
- Establish a recommended tree list
- Allow OSRD/Flexible Development by right; require a special permit for conventional subdivision
- Overhaul the landscaping section to ensure that landscaping fulfills multiple objectives

D. Regulatory Changes

Discussion Questions

- Do you agree that the Town should protect significant trees and require their replacement?
    - What kind of projects should be subject to tree protection requirements?
    - What makes a tree significant enough to protect? (Size?)

- Should more tree planting be required in subdivisions?
- Should more tree planting be required along the frontage of major projects, in buffers, and parking areas?

- Should parking requirements be revisited?
- Is OSRD/Flexible Development preferrable over conventional subdivision?
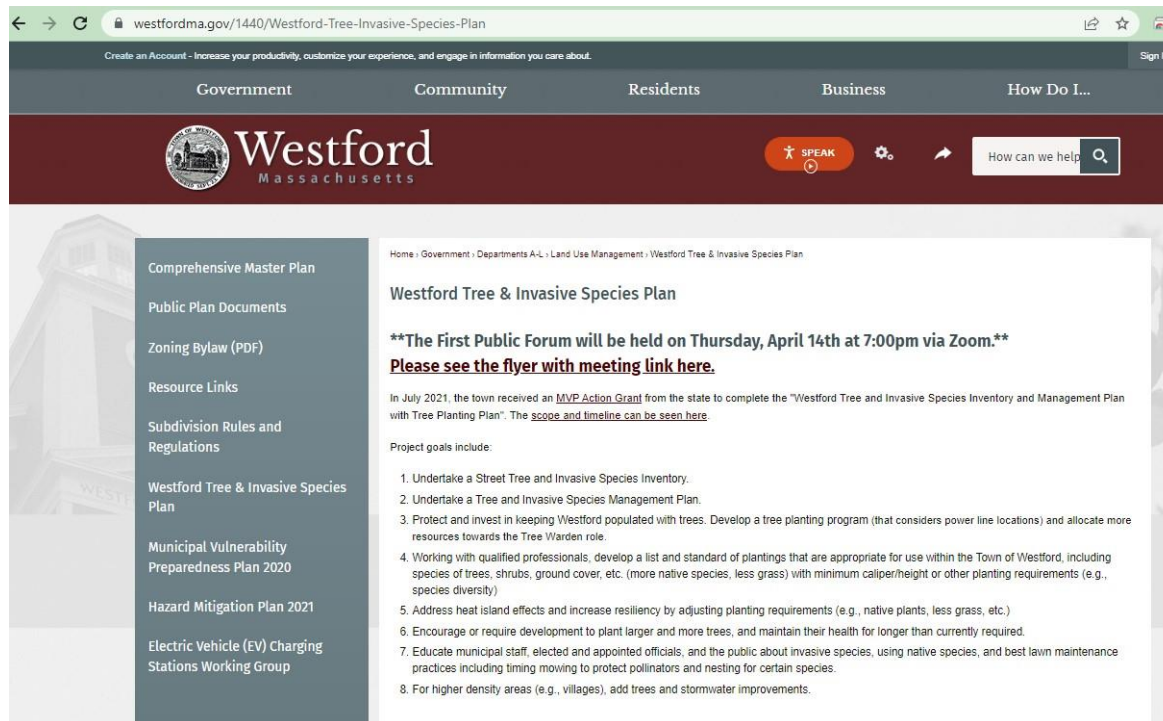
Ways to Stay Involved

Webpage

https://westfordma.gov/1440/Westford-Tree-Invasive-Species-Plan

Arbor Day

Friday April 28, 2023

Go plant a tree!

Thank you!

Contact:

Jeffrey Morrissette - Director of Land Use Management

Email: jmorrissette@westfordma.gov

Phone: (978) 692-5524

Image: Westford Comprehensive Master Plan